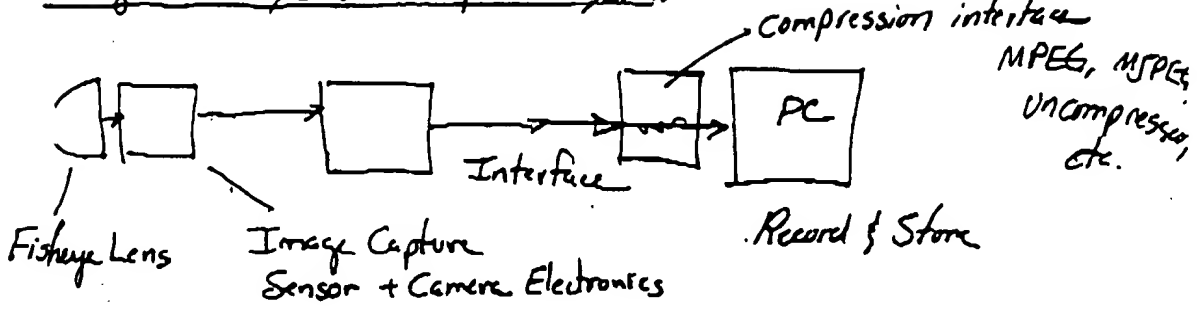
Image Capture Methods

Figure 1

Single Fisheye Lens Capture System



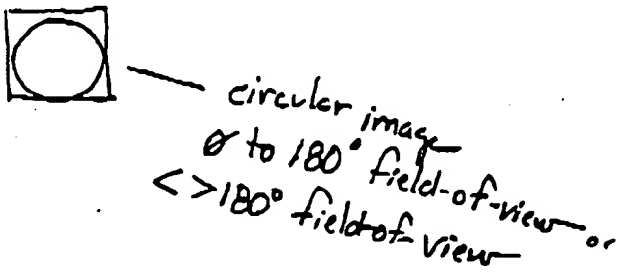


Figure 2

Back-to-Back lenses & sensor interface

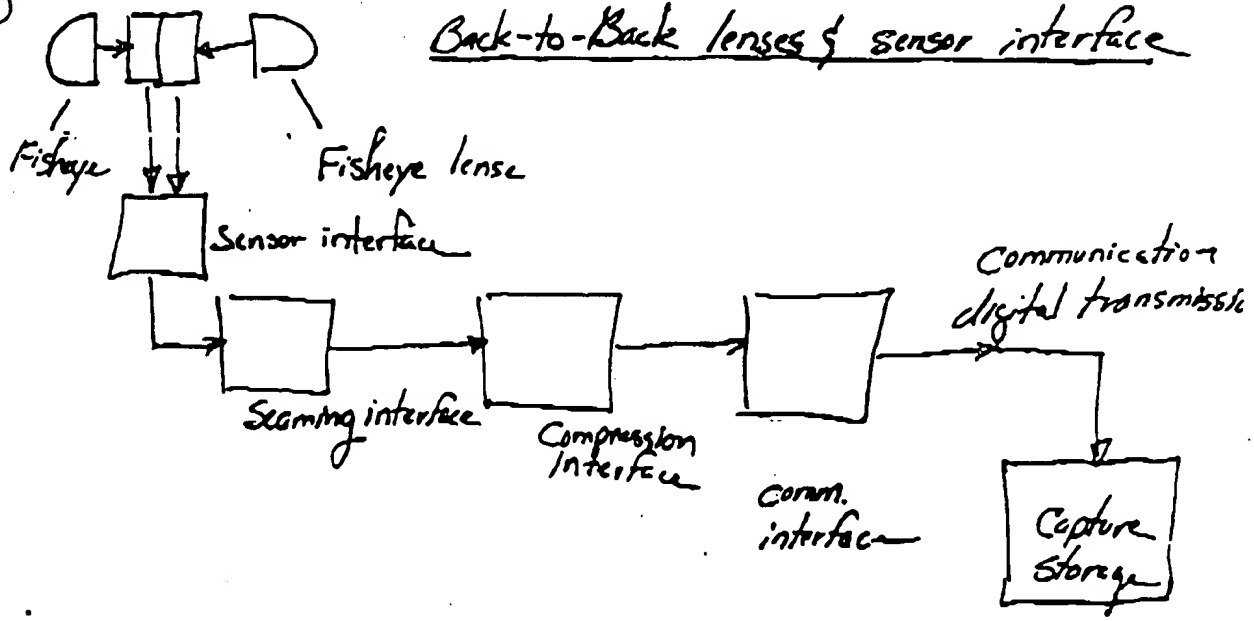


Figure 3

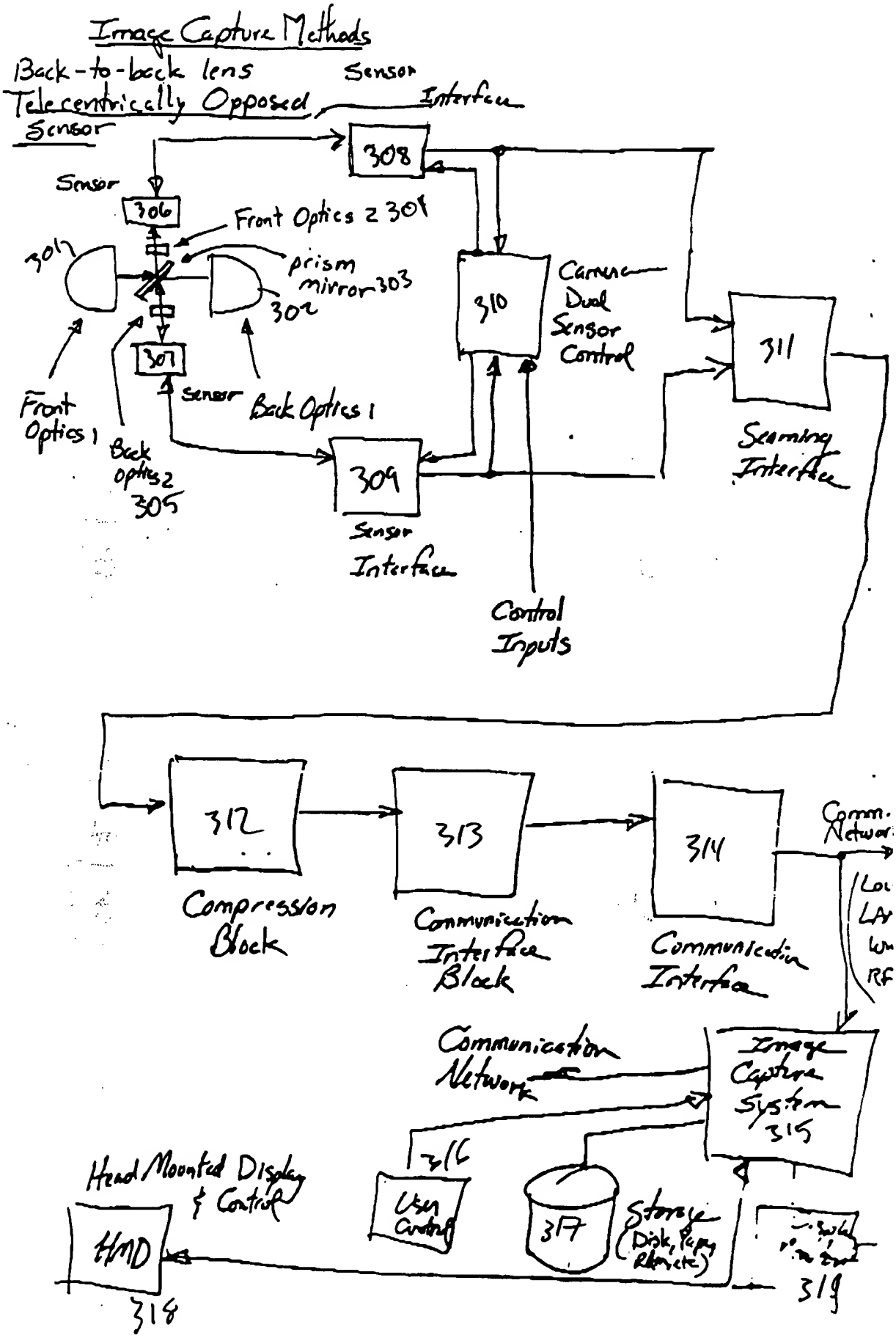
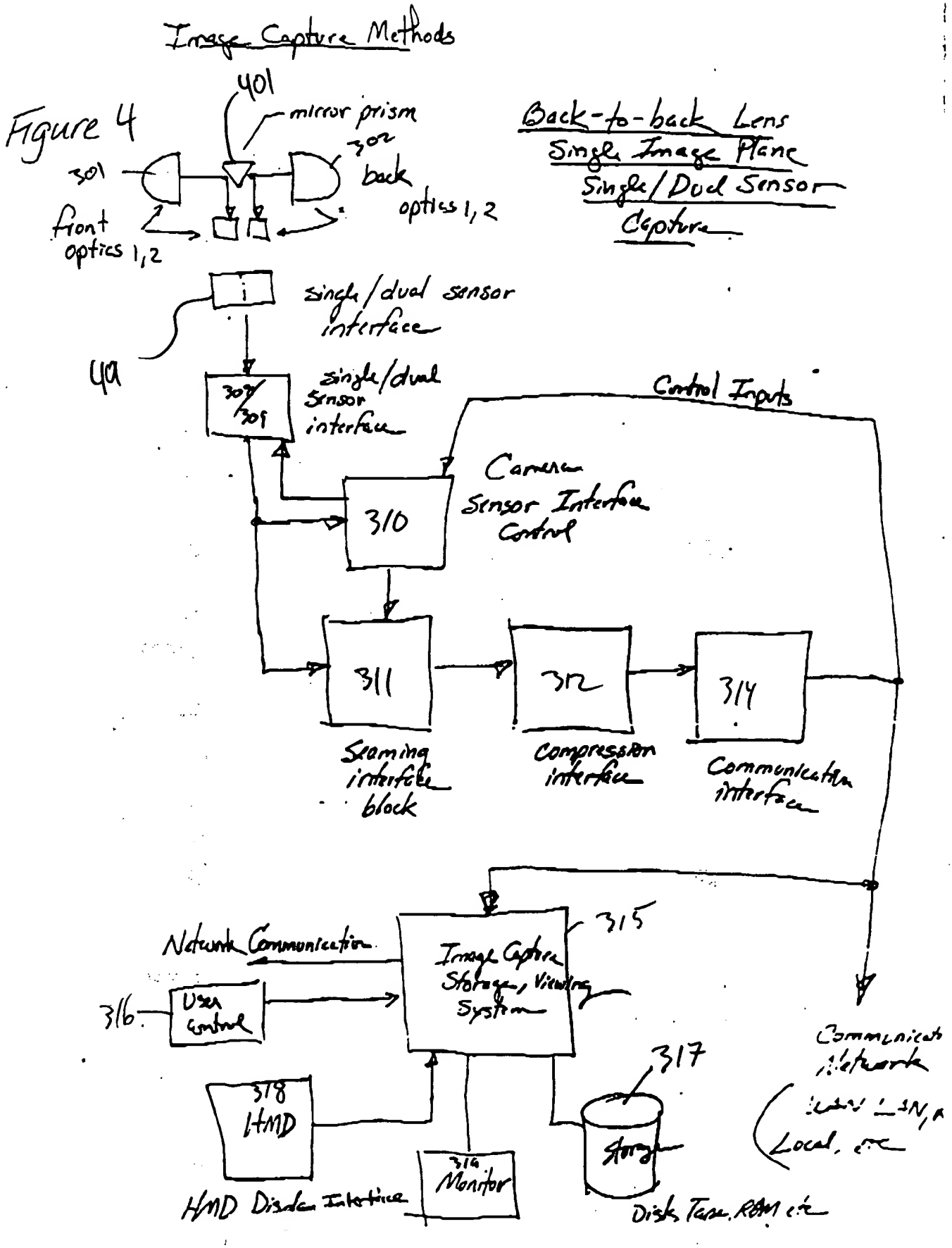


Image Capture Methods
Back-to-back lens Telecentrically Opposed Sensor
Sensor Interface
308
Sensor
306
Front Optics 2 301
301
prism mirror 303
302
310
Camera Dual Sensor Control
311
307
Sensor
Front Optics 1
Back optics 2 305
Back Optics 1
309
Sensor Interface
Seaming Interface
Control Inputs
312
Compression Block
313
Communication Interface Block
314
Communication Interface
Comm. Network
Communication Network
Image Capture System 315
316
User Control
317
Storage (Disk, Tape, Remote)
319
Head Mounted Display & Control
HMD
318

** TOTAL PAGE.19 **

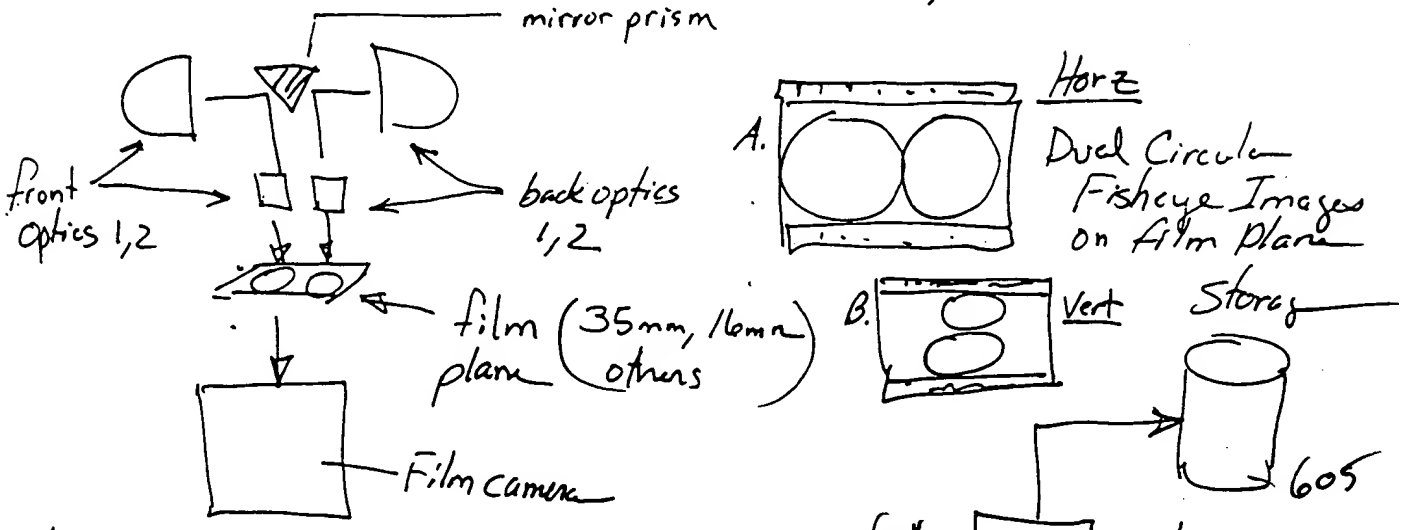
Figure 4



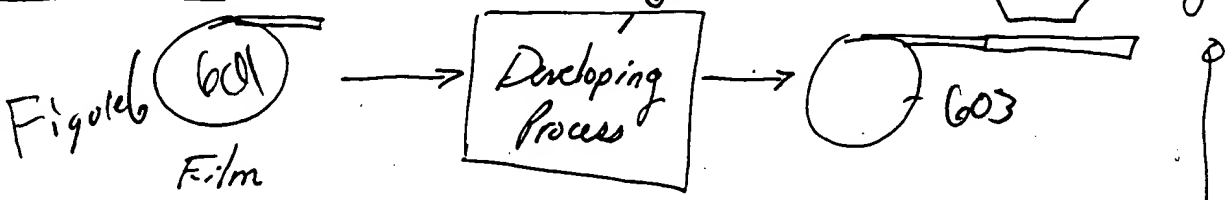
doc#no: 2695pbsp

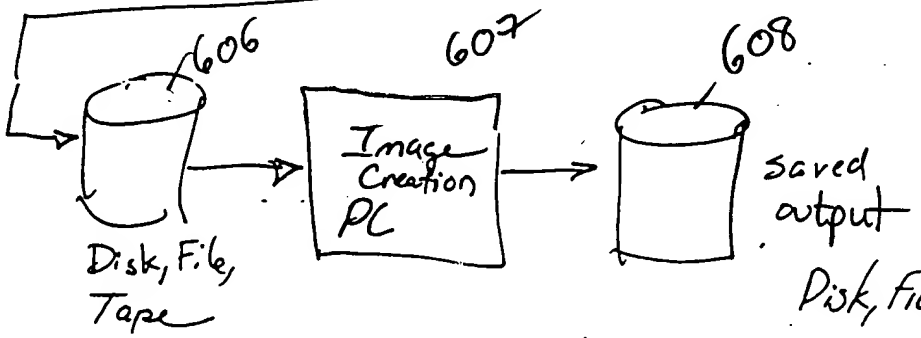
Image Capture Methods Figure 5

Back-to-back Lens to Film plane Camera System



Develop Process Flow





Software Method on PC to create file format

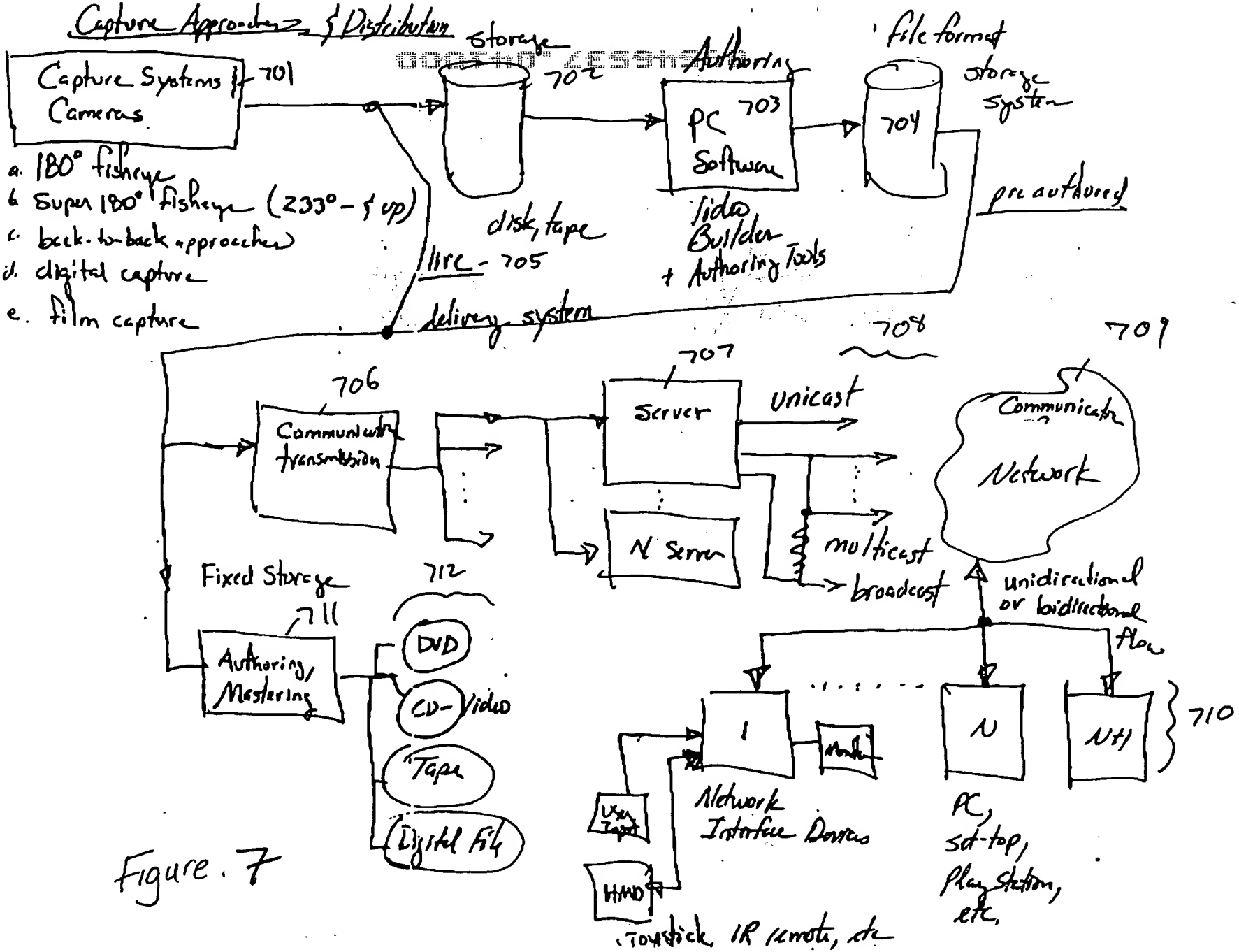

Capture Approaches & Distribution
Capture Systems / Cameras
701
a. 180° fisheye
b. Super 180° fisheye (233° - 5 up)
c. back-to-back approaches
d. digital capture
e. film capture
storage
disk, tape
702
Authoring
PC Software
703
Video Builder + Authoring Tools
file format
storage system
704
pre authored
live - 705
delivery system
708
709
706
Communication transmission
707
Server
unicast
N Server
multicast
broadcast
Communication Network
Fixed Storage
712
711
Authoring / Mastering
DVD
CD-Video
Tape
Digital File
unidirectional or bidirectional flow
1
N
N+1
710
Network Interface Devices
User Input
HMD
Joystick, IR remote, etc
PC, set-top, Play Station, etc.

Figure. 7

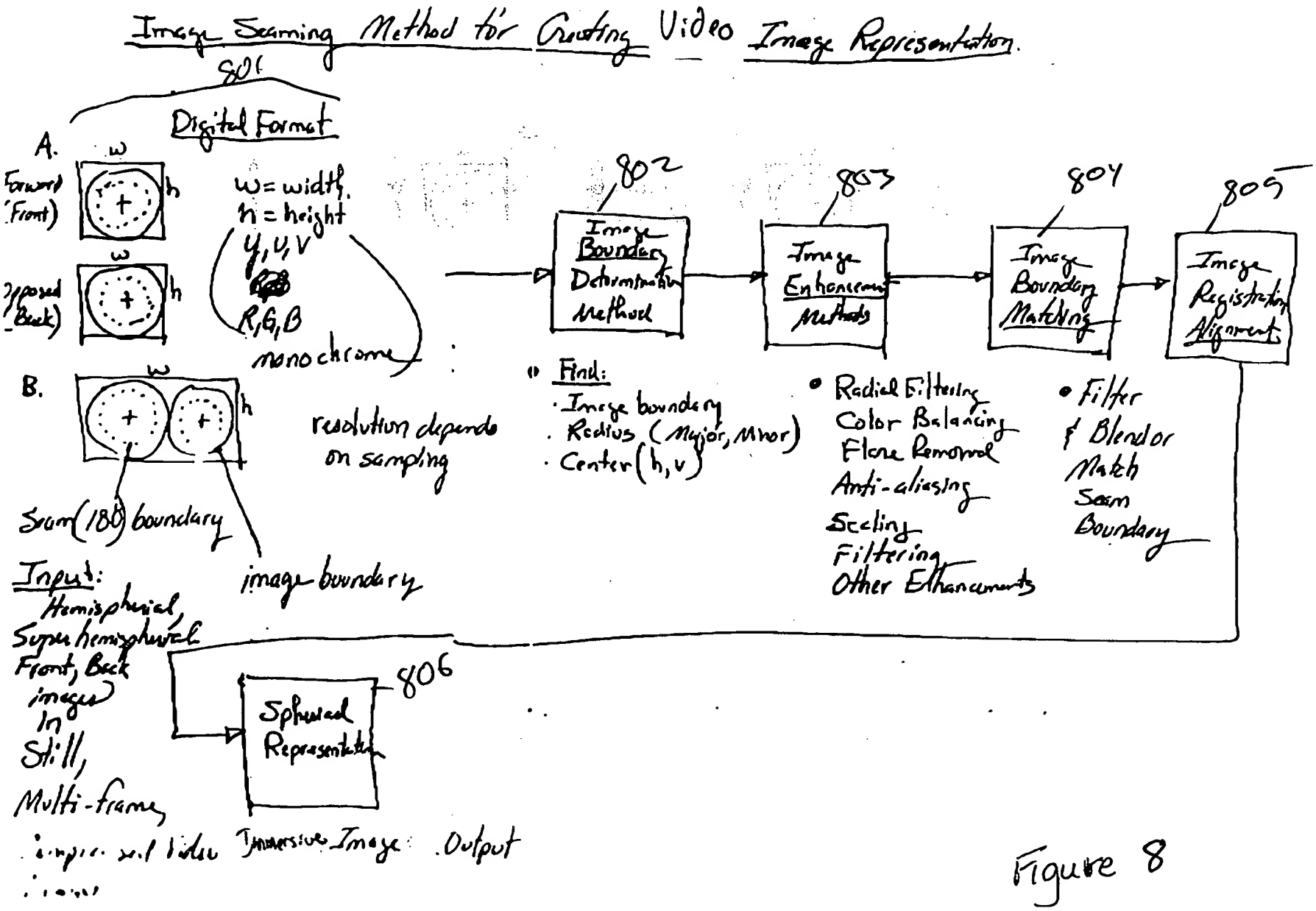


Image Seaming Method for Creating Video Image Representation.
801
Digital Format
A.
w
h
Forward (Front)
Opposed (Back)
w = width
h = height
Y, U, V
R, G, B
monochrome
B.
resolution depends on sampling
Seam (180) boundary
image boundary
Input:
Hemispherical,
Super hemispherical
Front, Back
images
In
Still,
Multi-frame
802
Image Boundary Determination Method
803
Image Enhancement Methods
804
Image Boundary Matching
805
Image Registering Alignment
• Find:
· Image boundary
· Radius (Major, Minor)
· Center (h, v)
• Radial Filtering
Color Balancing
Flare Removal
Anti-aliasing
Scaling
Filtering
Other Enhancements
• Filter & Blend or Match Seam Boundary
806
Spherical Representation
Immersive Image Output

Figure 8

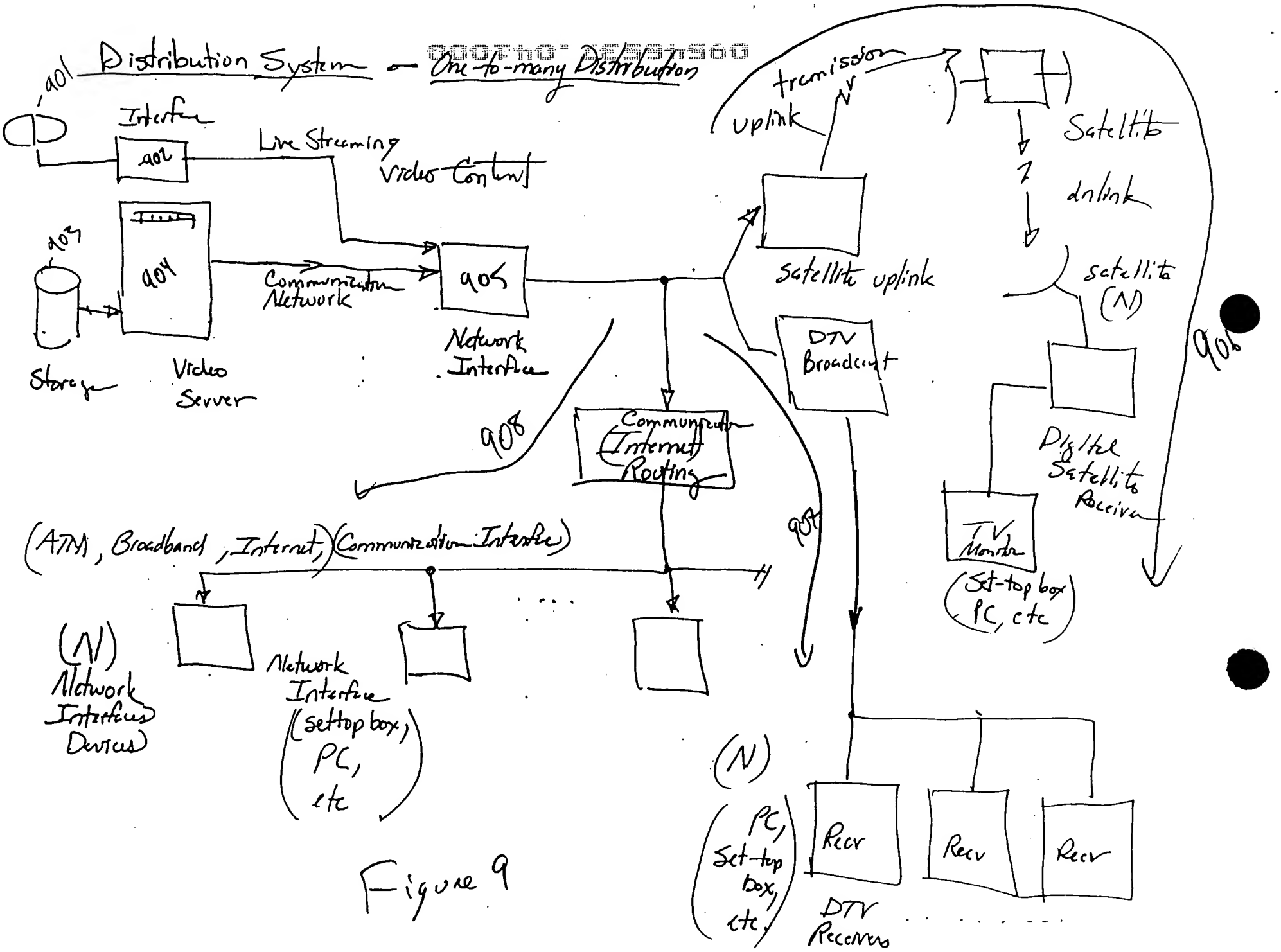
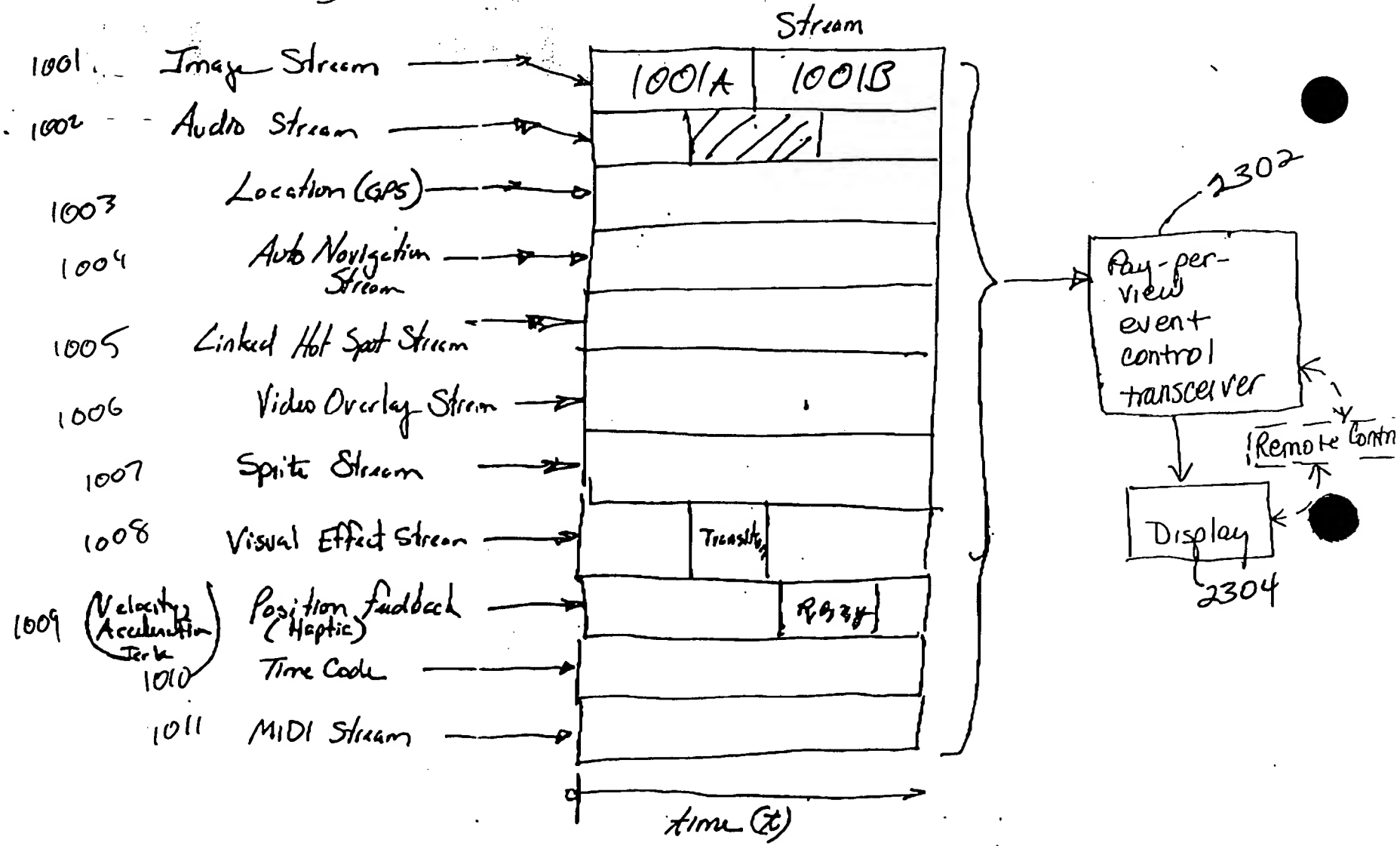

Distribution System – One-to-many Distribution
901
Interface
902
Live Streaming Video Content
907
904
Storage
Video Server
Communication Network
905
Network Interface
908
Communication Internet Routing
(ATM, Broadband, Internet) (Communication Interface)
(N) Network Interface Devices
Network Interface (settop box, PC, etc
(N) (PC, Set-top box, etc
Recv
Recv
Recv
DTV Receivers
uplink
transmission
Satellite uplink
DTV Broadcast
Satellite
downlink
satellite (N)
Digital Satellite Receiver
TV Monitor
(Set-top box PC, etc
909

Figure 9

Figure 10


Stream
1001 Image Stream
1002 Audio Stream
1003 Location (GPS)
1004 Auto Navigation Stream
1005 Linked Hot Spot Stream
1006 Video Overlay Stream
1007 Sprite Stream
1008 Visual Effect Stream
1009 (Velocity Acceleration Jerk) Position Feedback (Haptic)
1010 Time Code
1011 MIDI Stream
1001A
1001B
time (t)
2302
Pay-per-view event control transceiver
Remote Contr
Display
2304

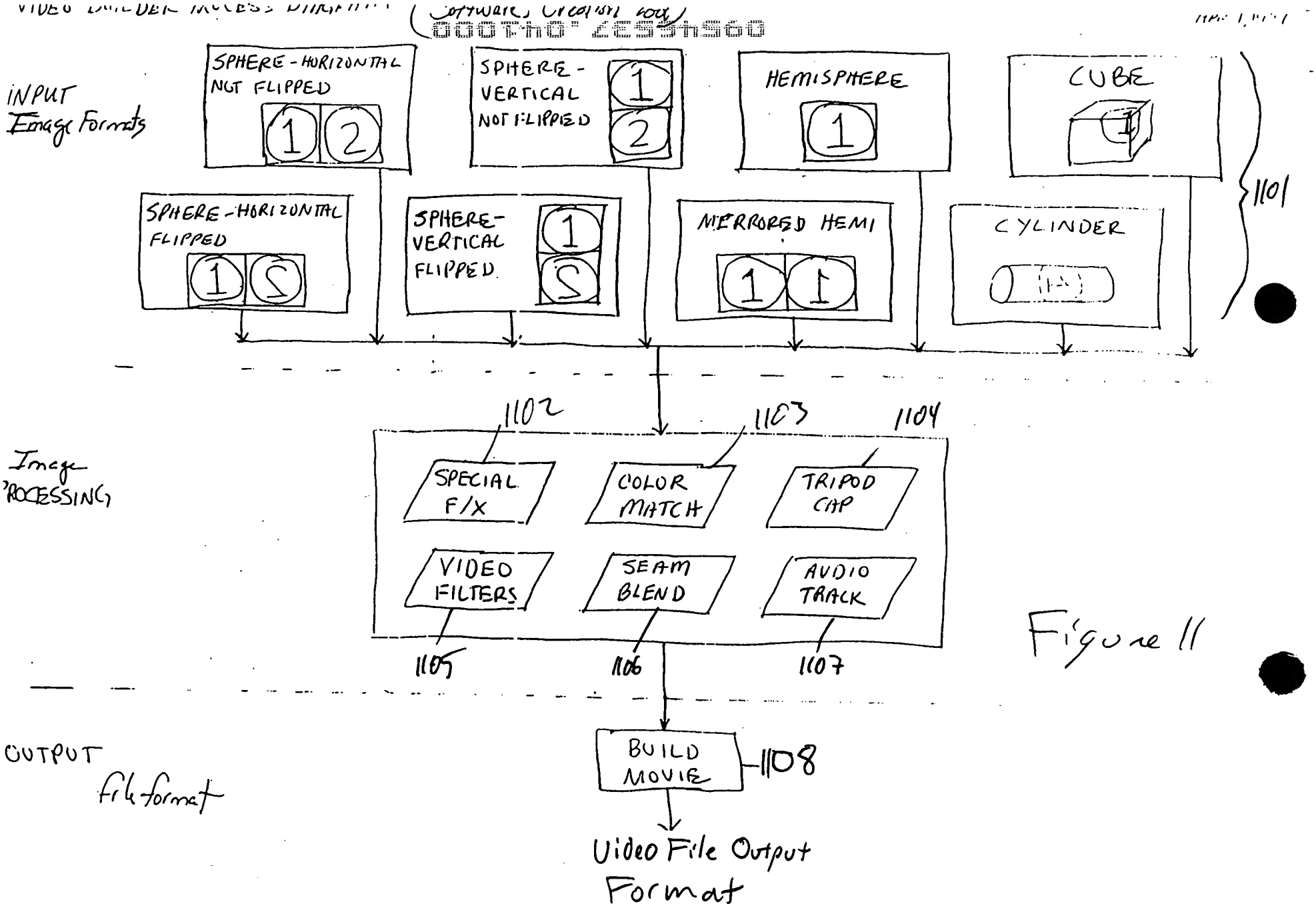

INPUT
Image Formats
SPHERE - HORIZONTAL NOT FLIPPED
SPHERE - VERTICAL NOT FLIPPED
HEMISPHERE
CUBE
SPHERE - HORIZONTAL FLIPPED
SPHERE - VERTICAL FLIPPED
MIRRORED HEMI
CYLINDER
1101
1102
1103
1104
Image PROCESSING
SPECIAL F/X
COLOR MATCH
TRIPOD CAP
VIDEO FILTERS
SEAM BLEND
AUDIO TRACK
1105
1106
1107
BUILD MOVIE
1108
OUTPUT
file format
Video File Output Format

Figure 11

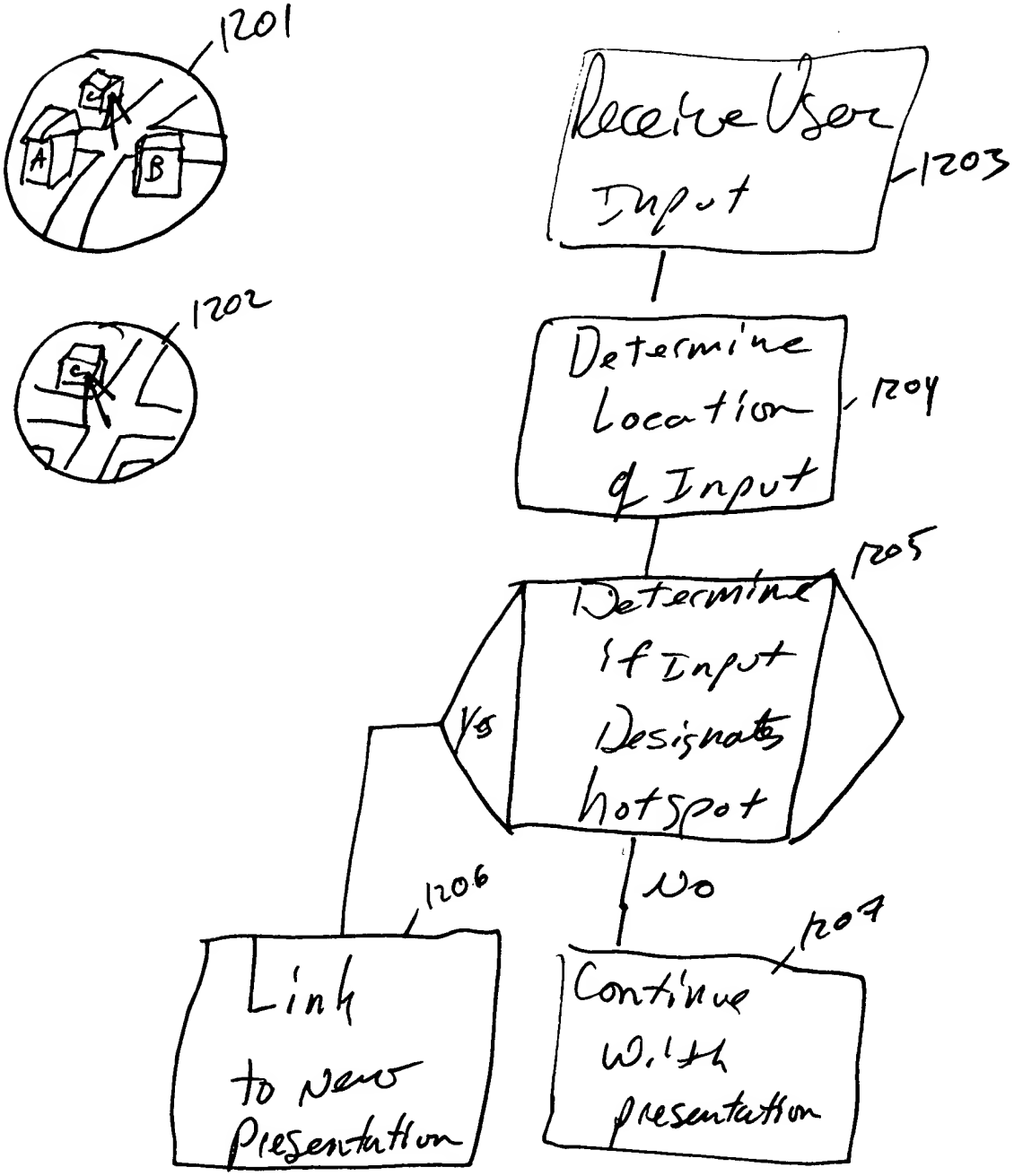

1201
A
B
1202
Receive User Input
1203
Determine Location of Input
1204
Determine If Input Designates Hotspot
1205
Yes
No
1206
Link to New Presentation
1207
Continue With Presentation

Figure 12

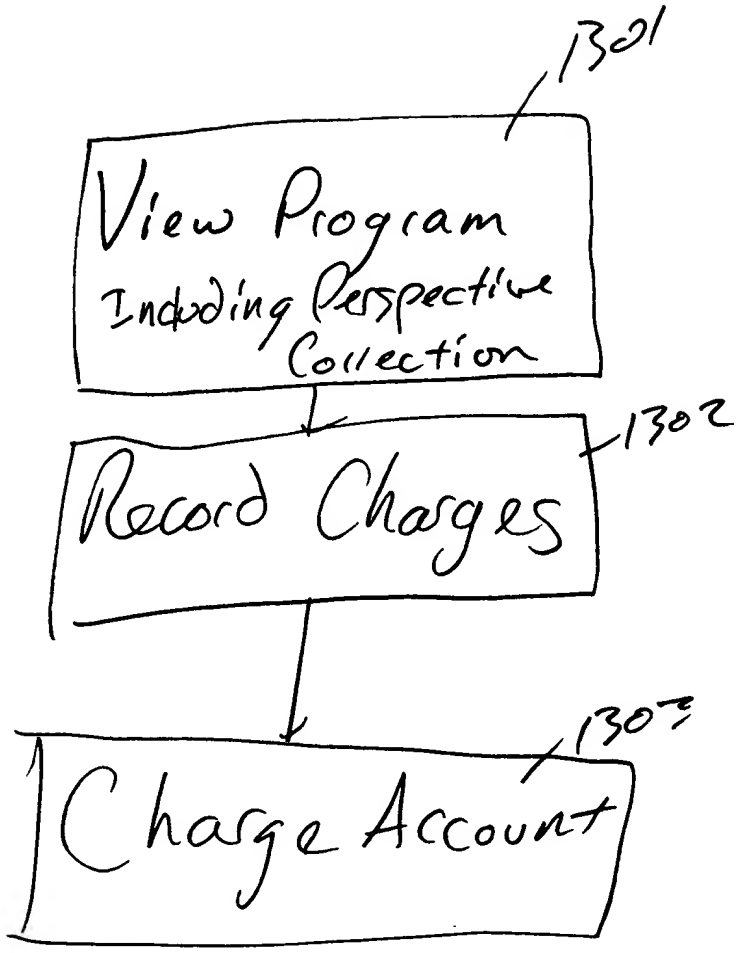
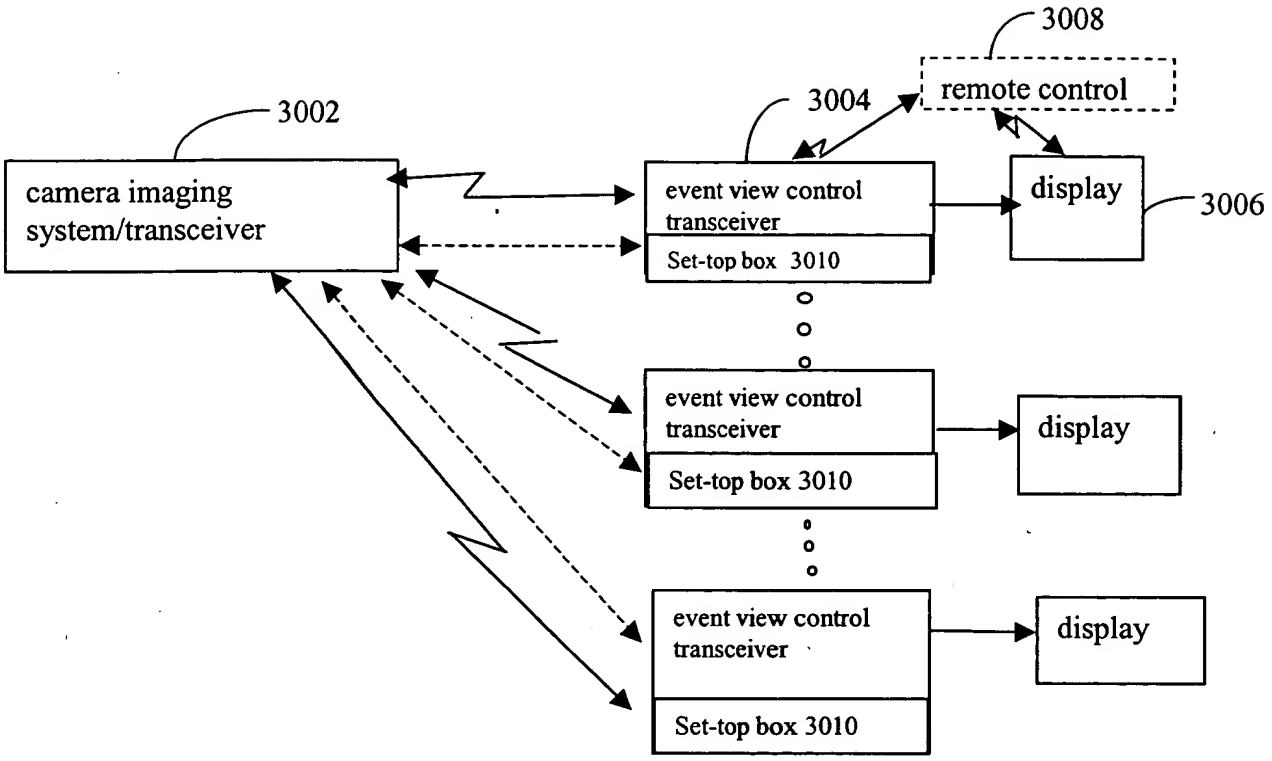


Figure 13

6666740 "2345678910

Figure 14


3008
remote control
3004
3002
camera imaging system/transceiver
event view control transceiver
Set-top box 3010
display
3006
event view control transceiver
Set-top box 3010
display
event view control transceiver
Set-top box 3010
display

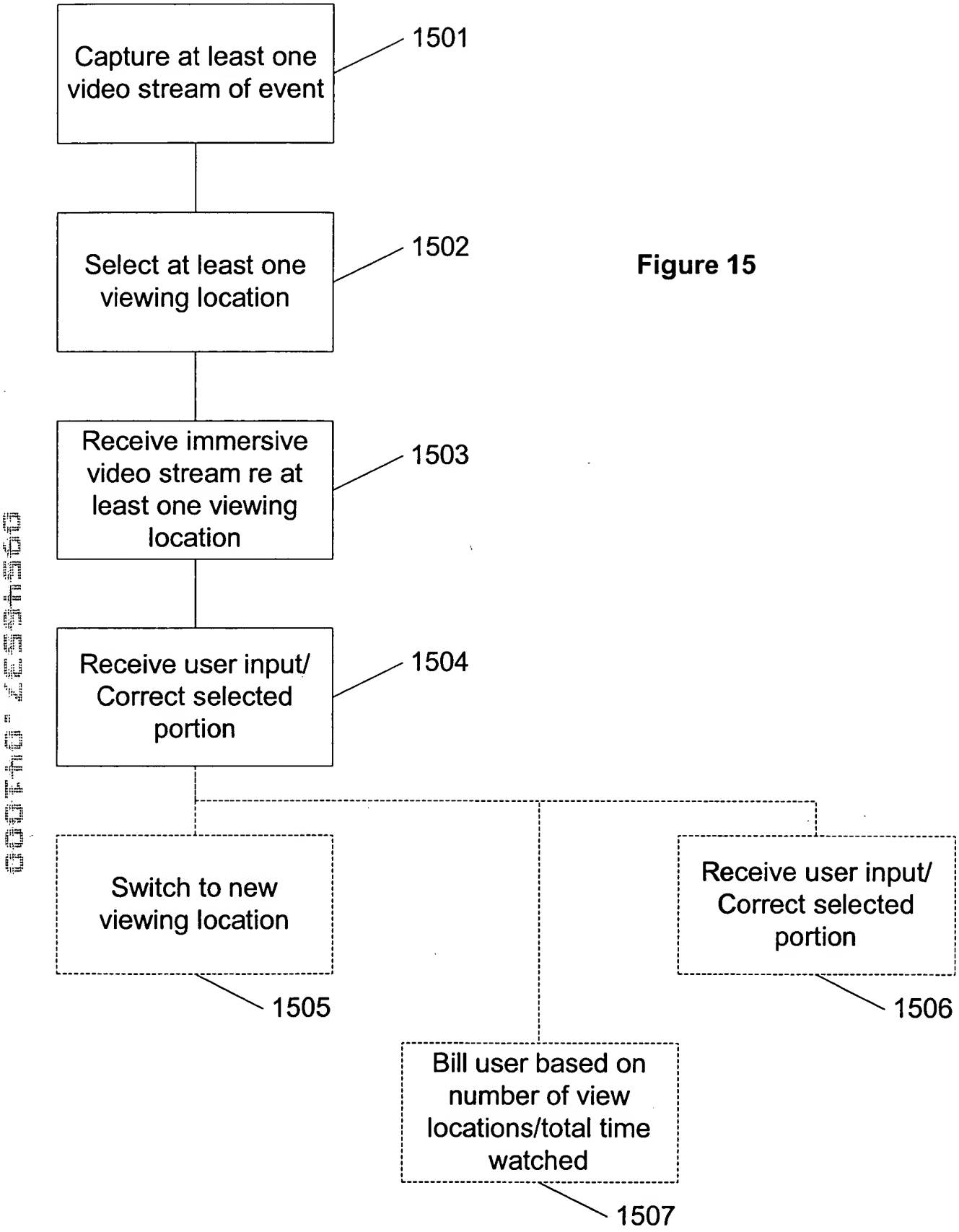

Capture at least one video stream of event
1501
Select at least one viewing location
1502
Receive immersive video stream re at least one viewing location
1503
Receive user input/ Correct selected portion
1504
Switch to new viewing location
1505
Receive user input/ Correct selected portion
1506
Bill user based on number of view locations/total time watched
1507

Figure 15

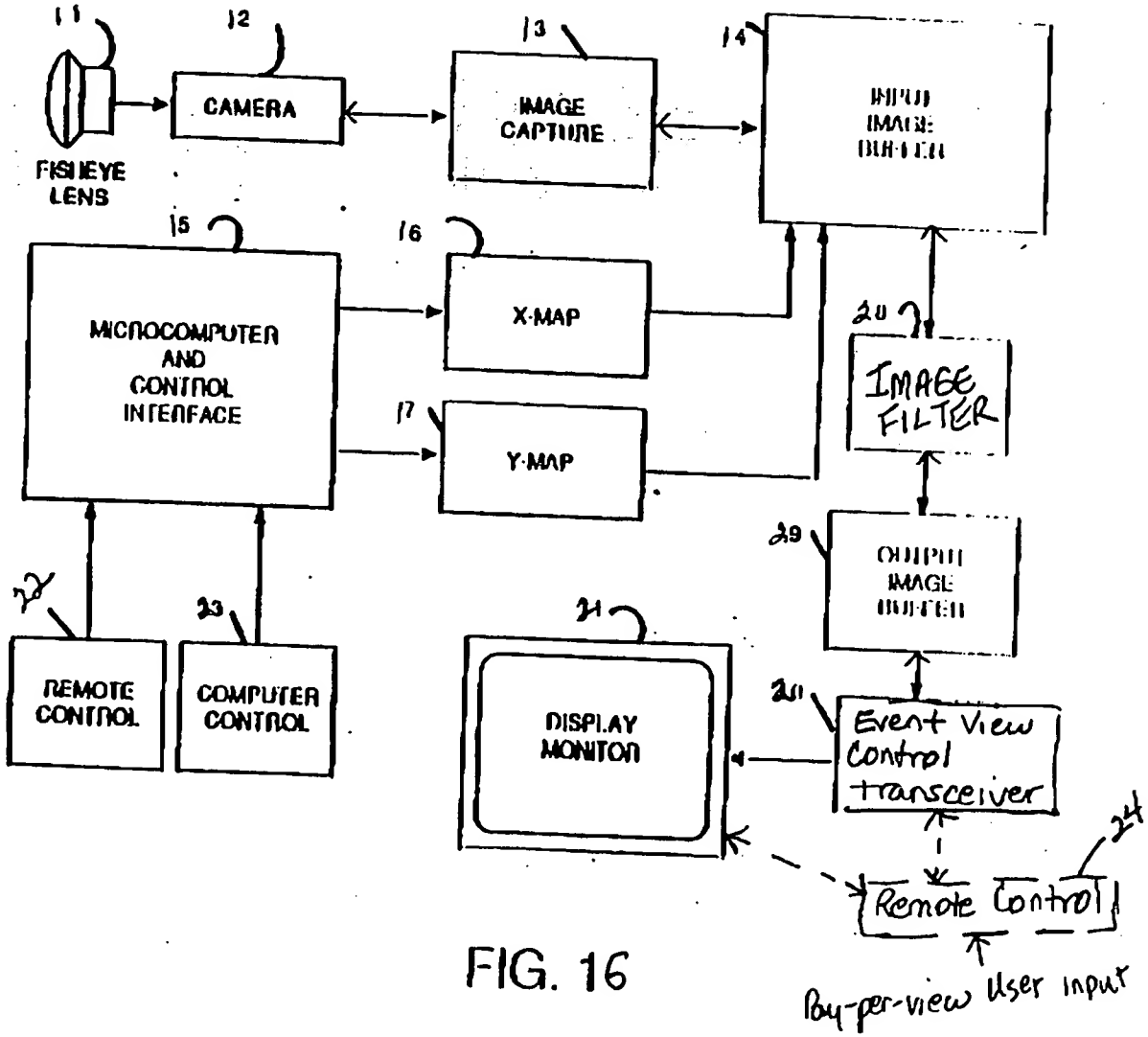

11
12
13
14
FISHEYE LENS
CAMERA
IMAGE CAPTURE
INPUT IMAGE BUFFER
15
16
MICROCOMPUTER AND CONTROL INTERFACE
X-MAP
20
IMAGE FILTER
17
Y-MAP
29
OUTPUT IMAGE BUFFER
22
23
21
REMOTE CONTROL
COMPUTER CONTROL
DISPLAY MONITOR
28
Event View Control transceiver
24
Remote Control
Buy-per-view User input

FIG. 16

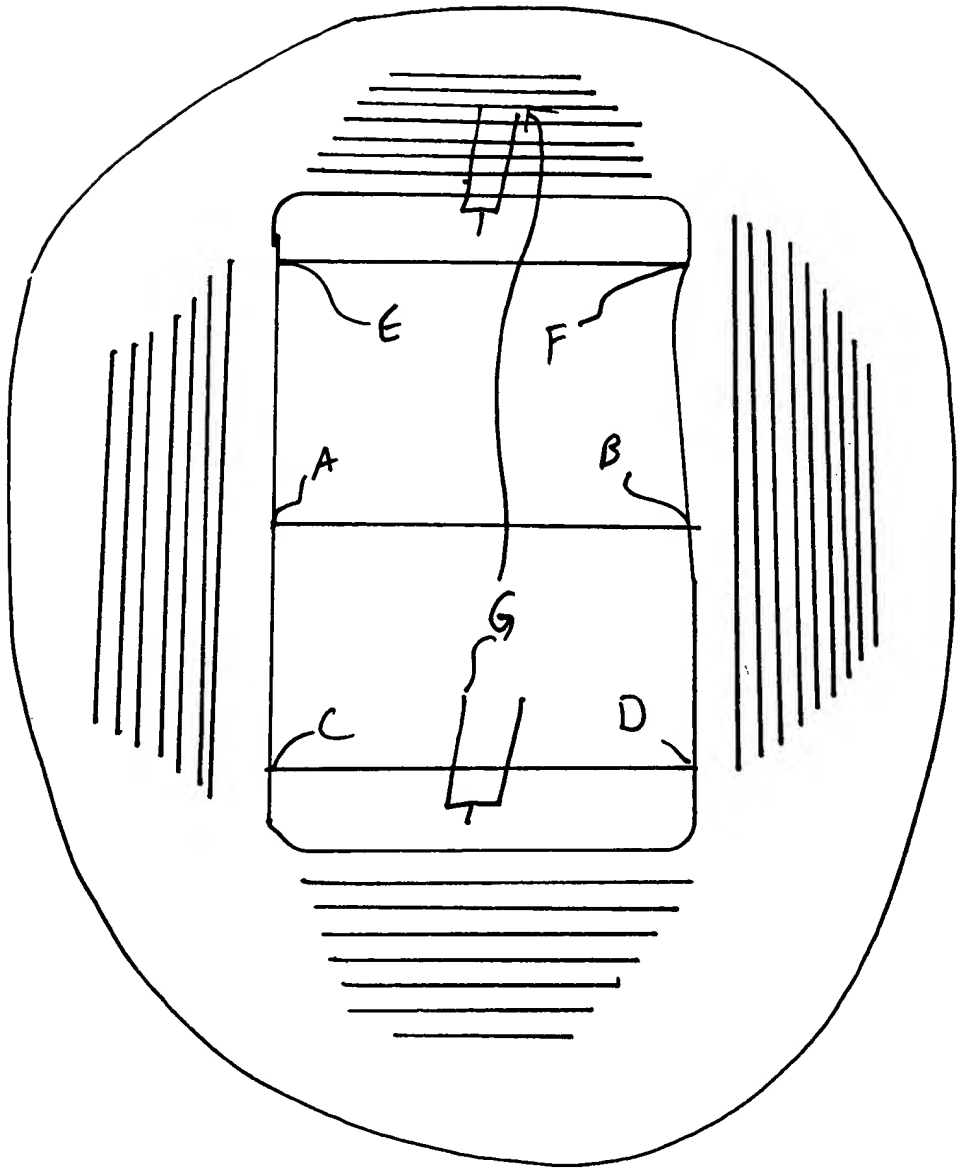


Figure 17

6667+0 "2"sdrawing

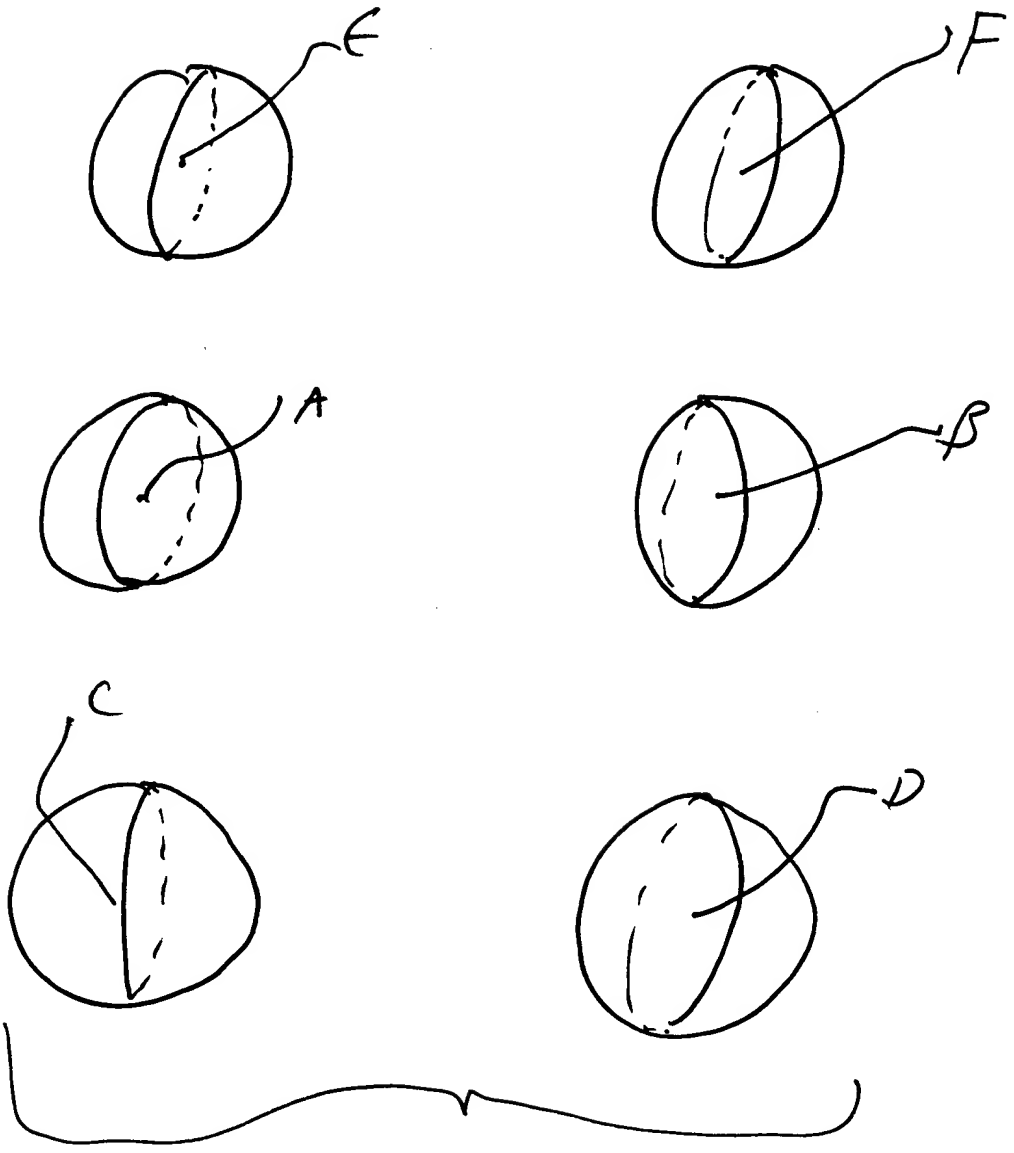


Figure 18

doc-tho-2ssthmb

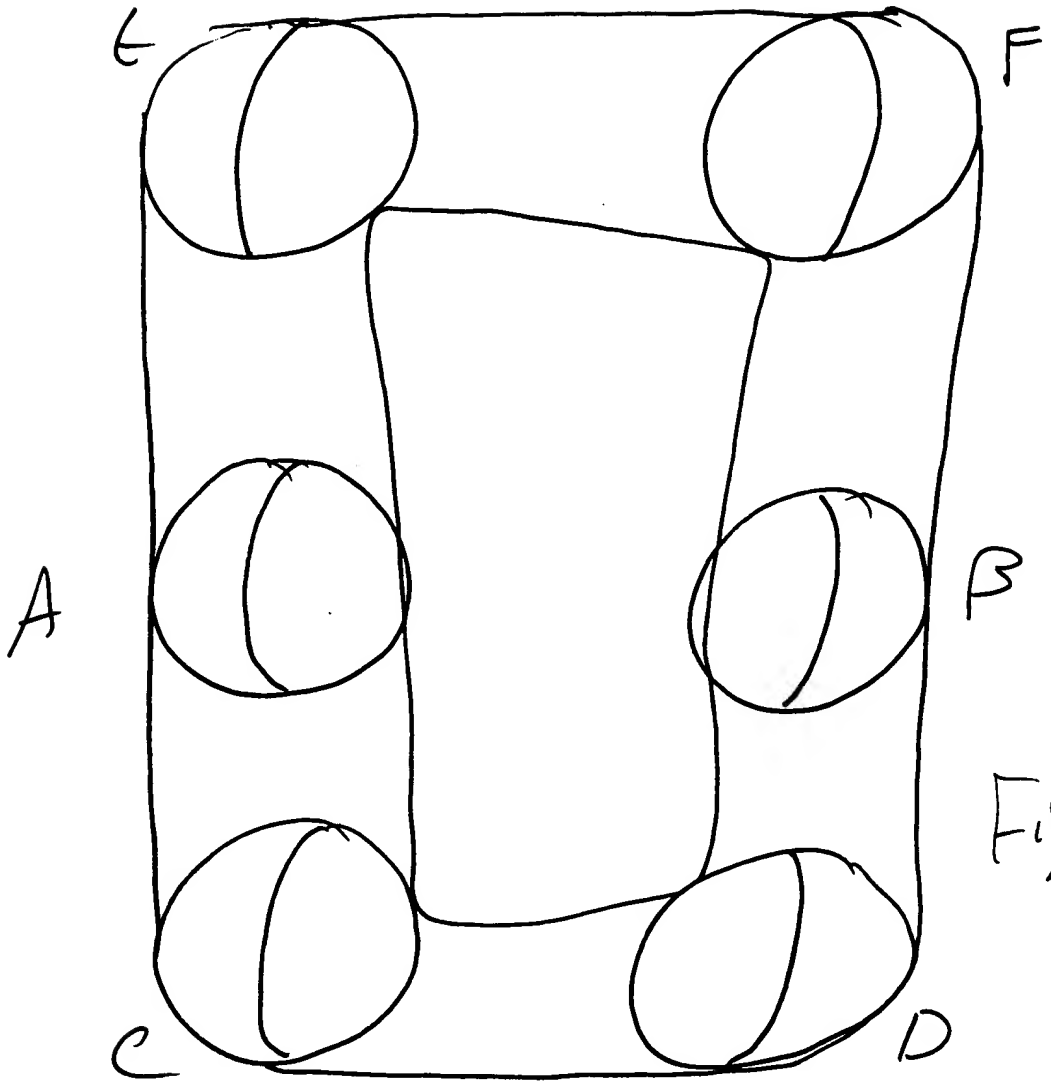


Figure 19

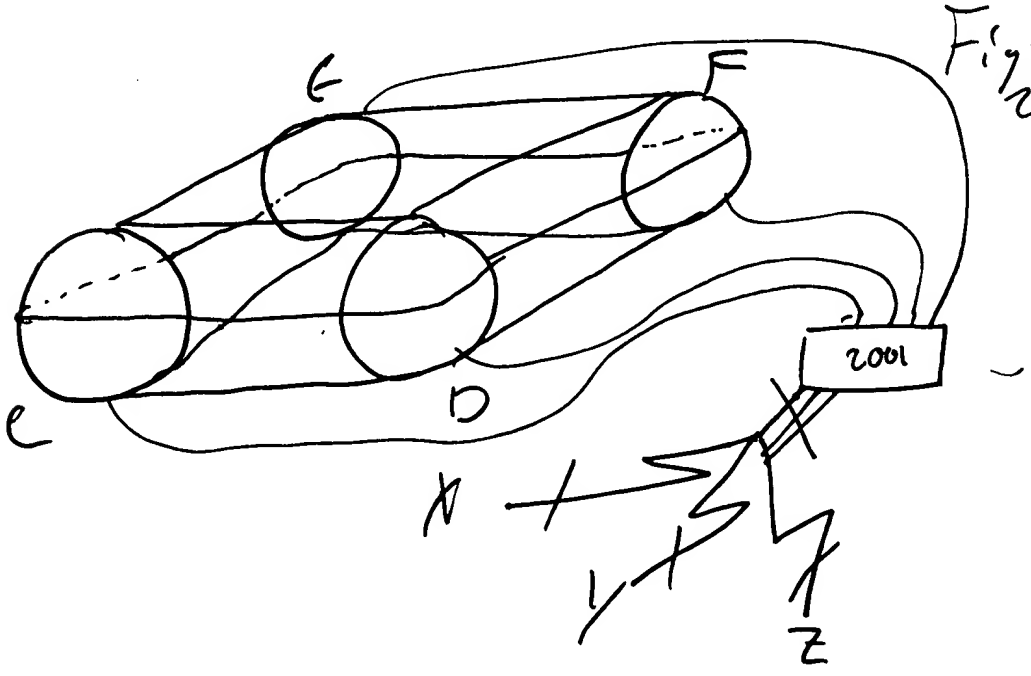


Figure 20

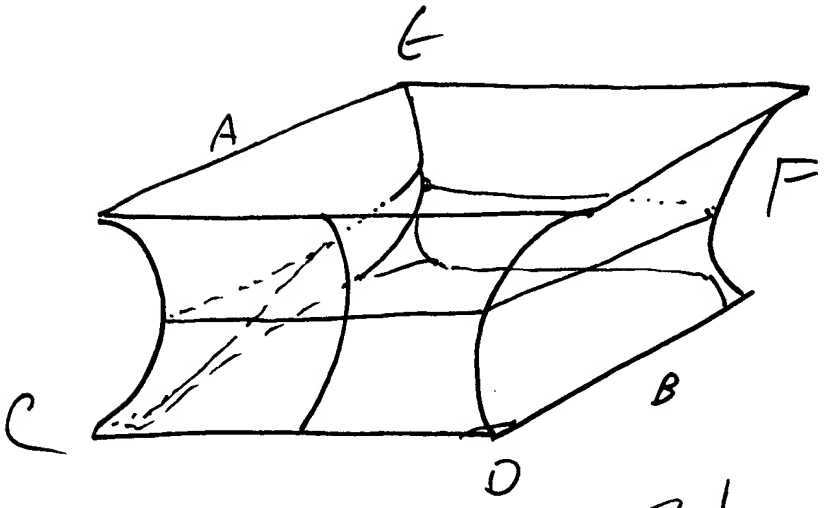


Figure 21

doc-to-Jesus

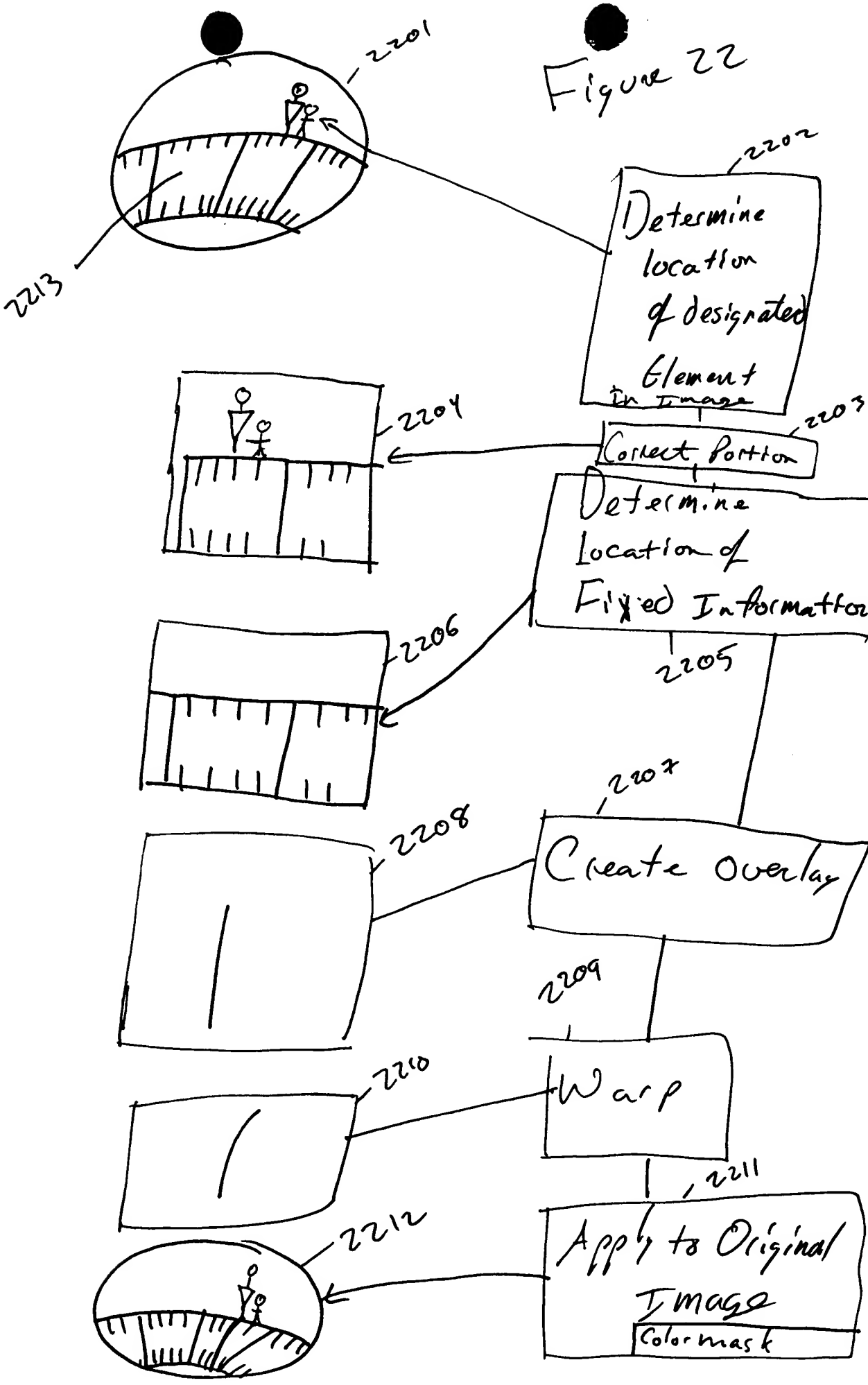

2201
2213
2202
Determine location of designated Element in Image
2204
2203
Correct Portion
Determine Location of Fixed Information
2206
2205
2208
2207
Create Overlay
2209
2210
Warp
2211
2212
Apply to Original Image
Colormask

Figure 22

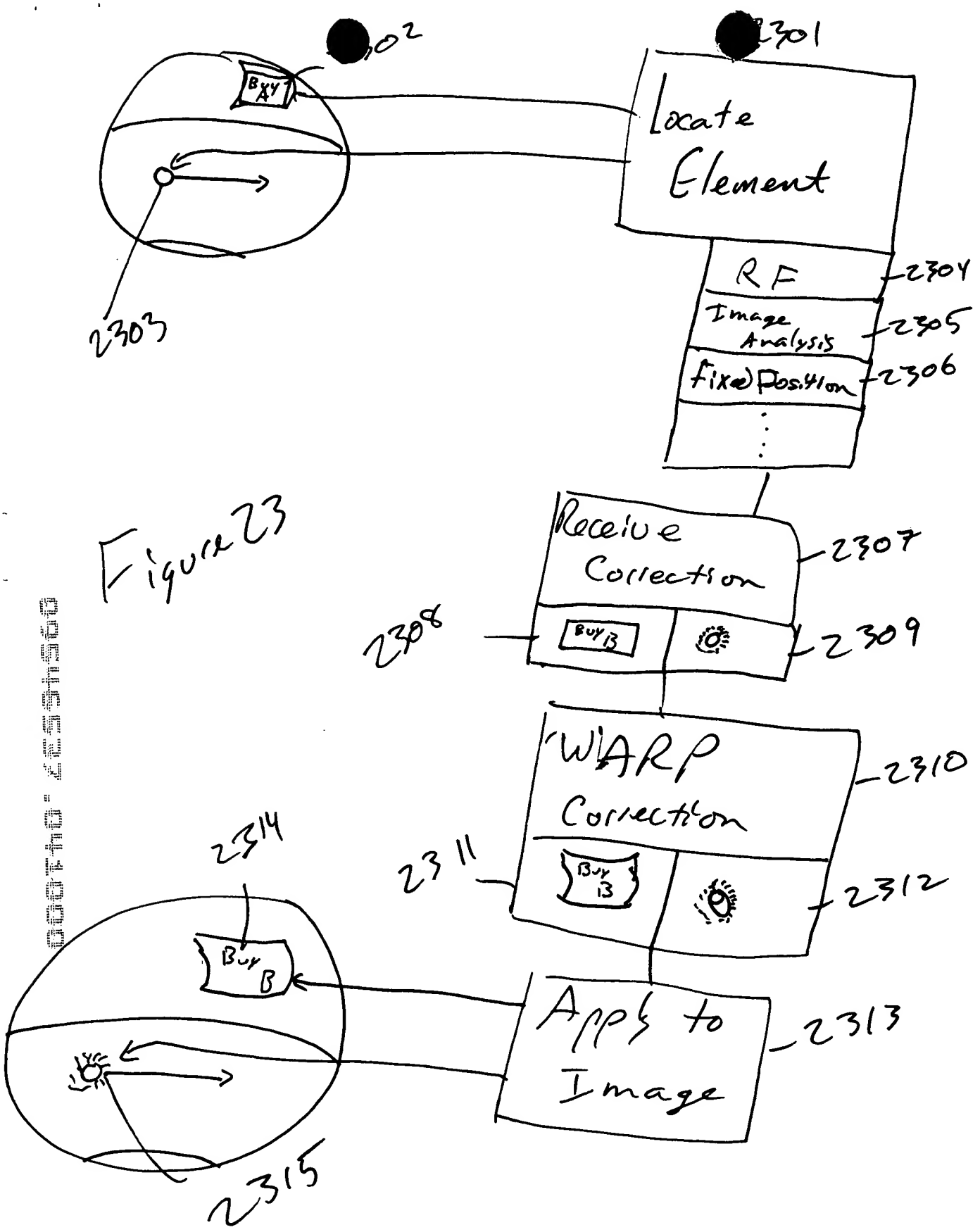

2302
2301
Buy A
Locate Element
2303
RF
2304
Image Analysis
2305
Fixed Position
2306
Receive Correction
2307
2308
Buy B
2309
WARP Correction
2310
2311
Buy B
2312
2314
Buy B
Apply to Image
2313
2315

Figure 23

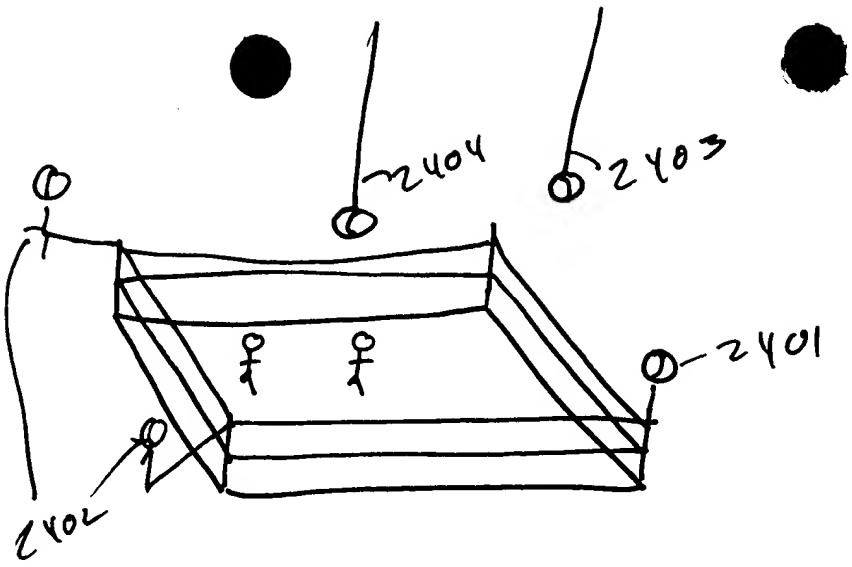


Figure 24

Sheet 23 of 35

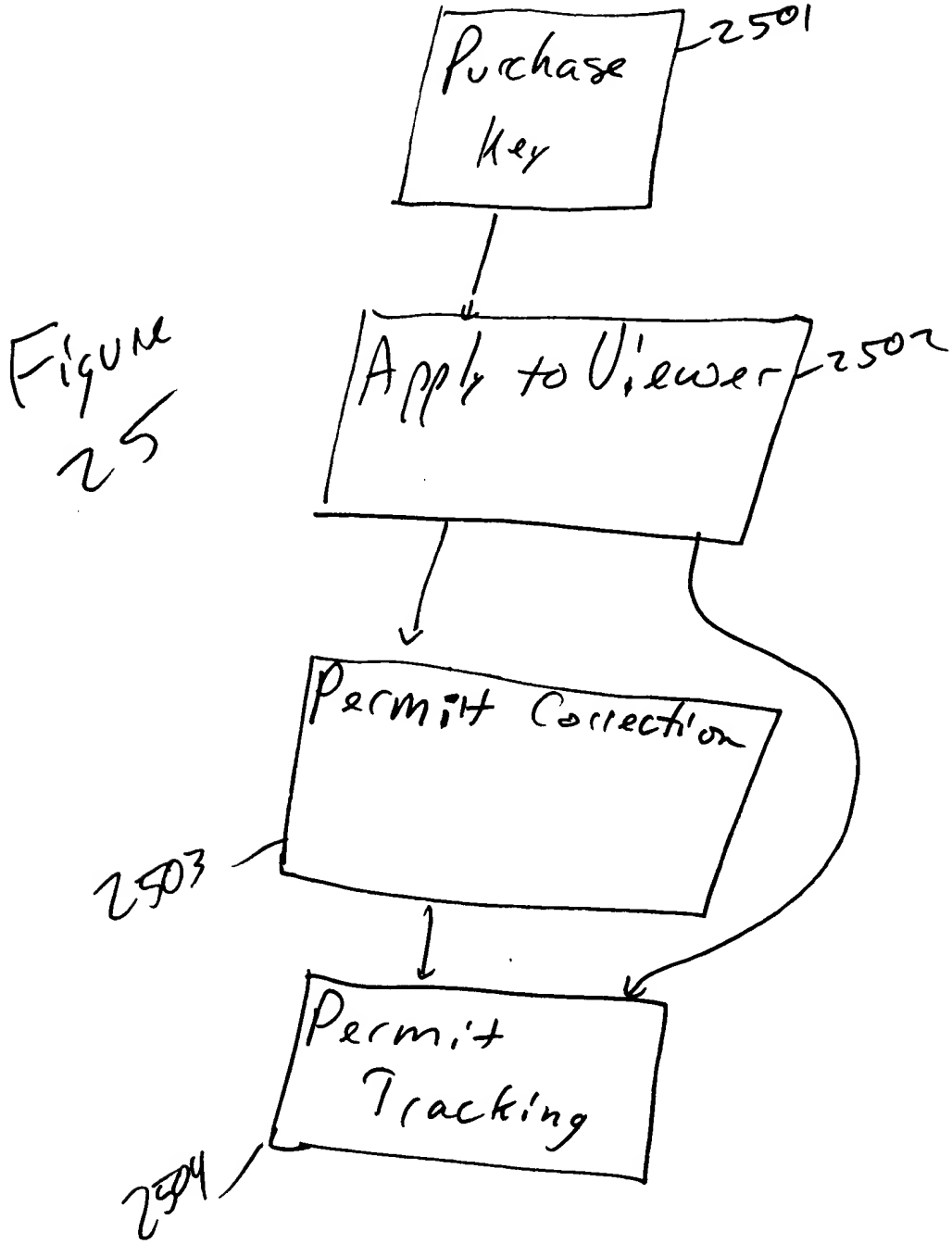

Purchase Key
2501
Apply to Viewer
2502
Permit Correction
2503
Permit Tracking
2504

Figure 25

Figure 26

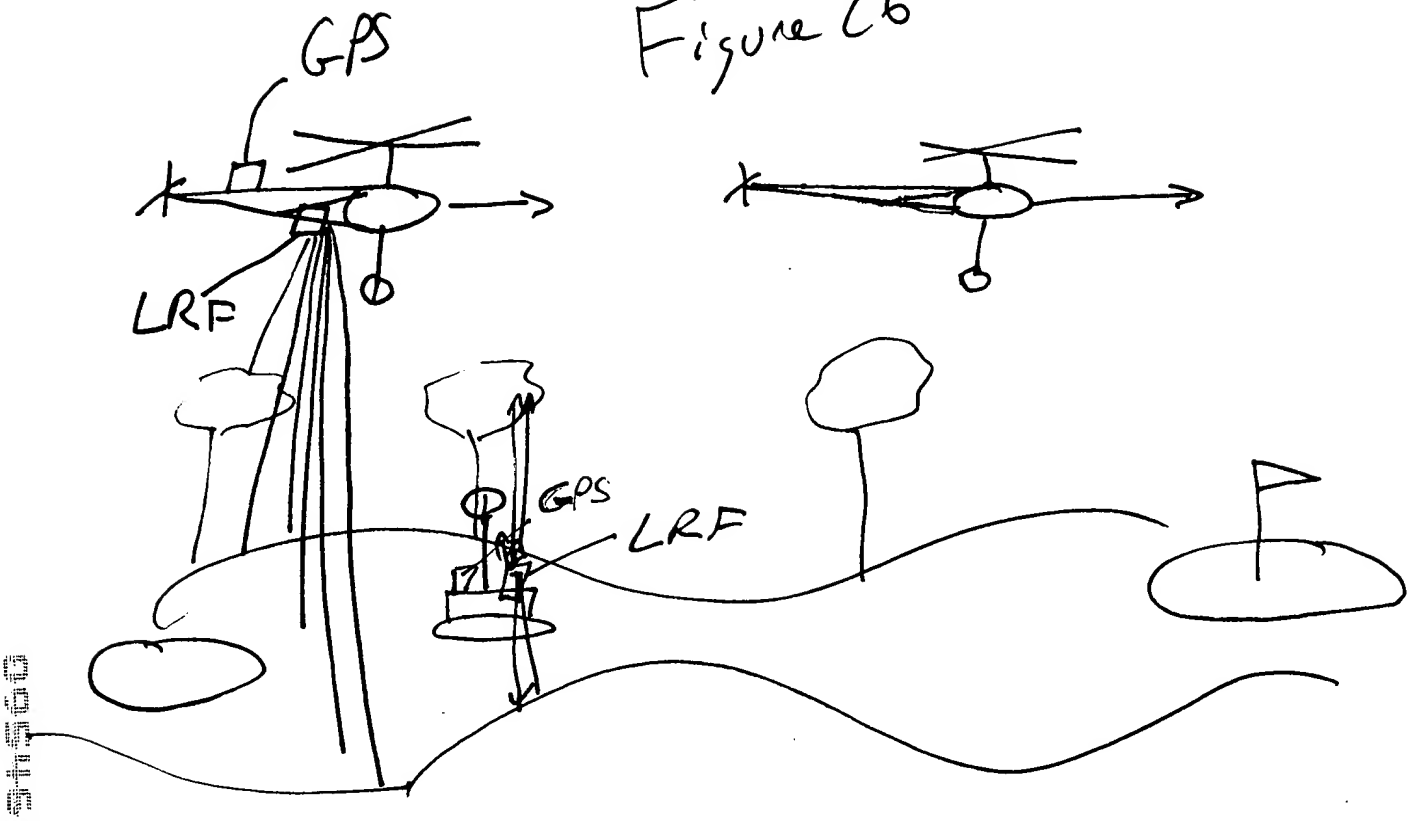
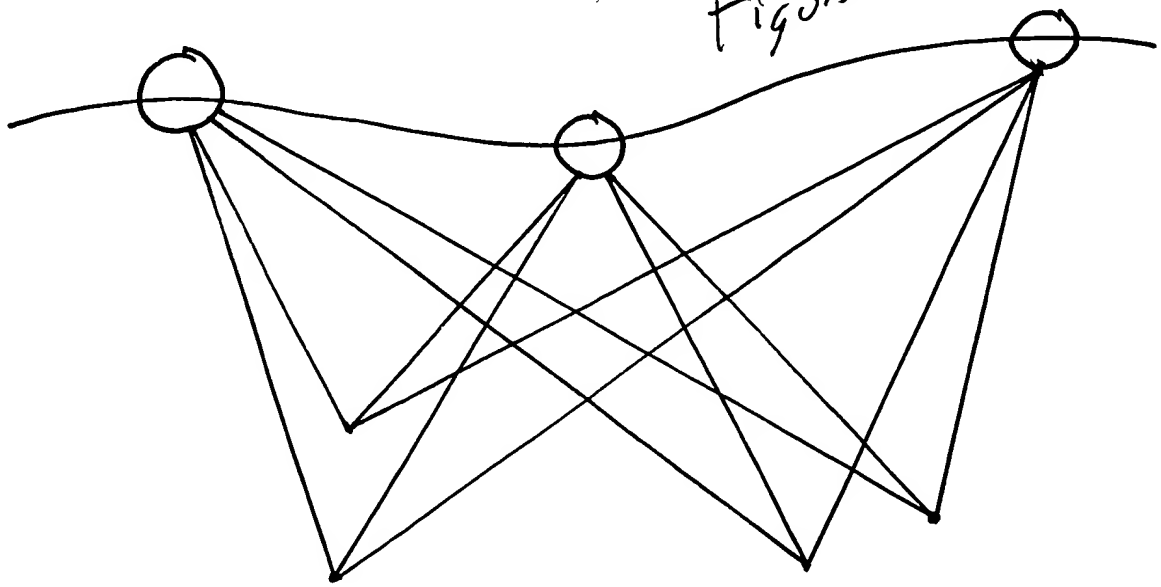


Figure 27



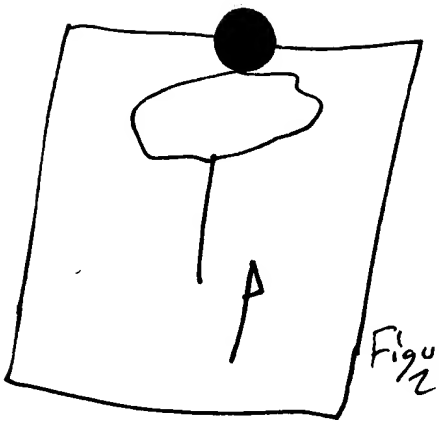


Figure 28A

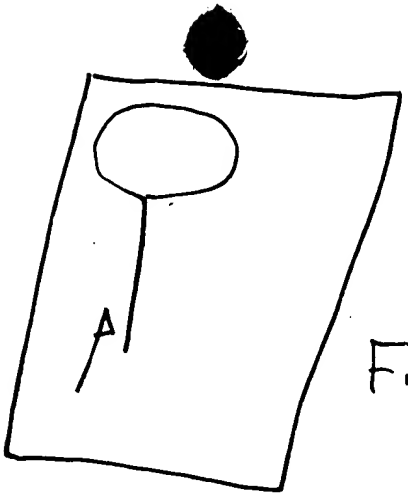


Figure 28B

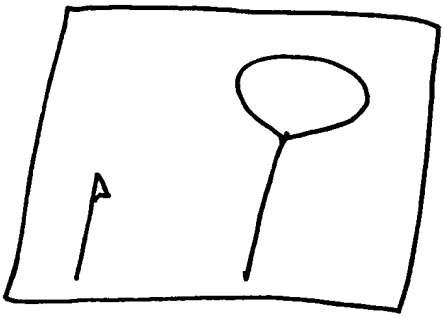


Figure 28C

Confidential

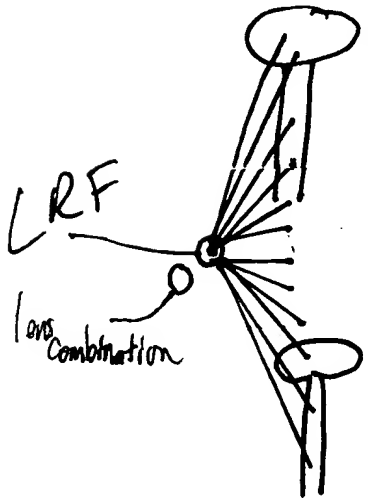


Figure 29

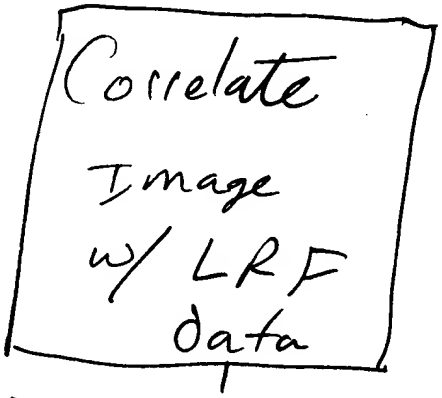


Figure 30

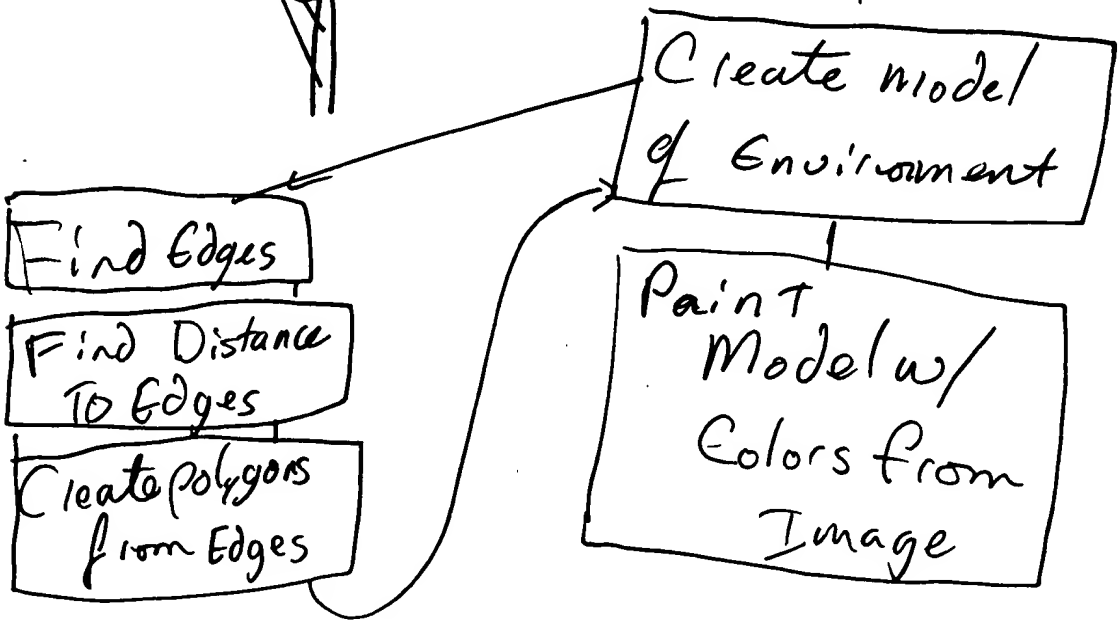


Figure 31A

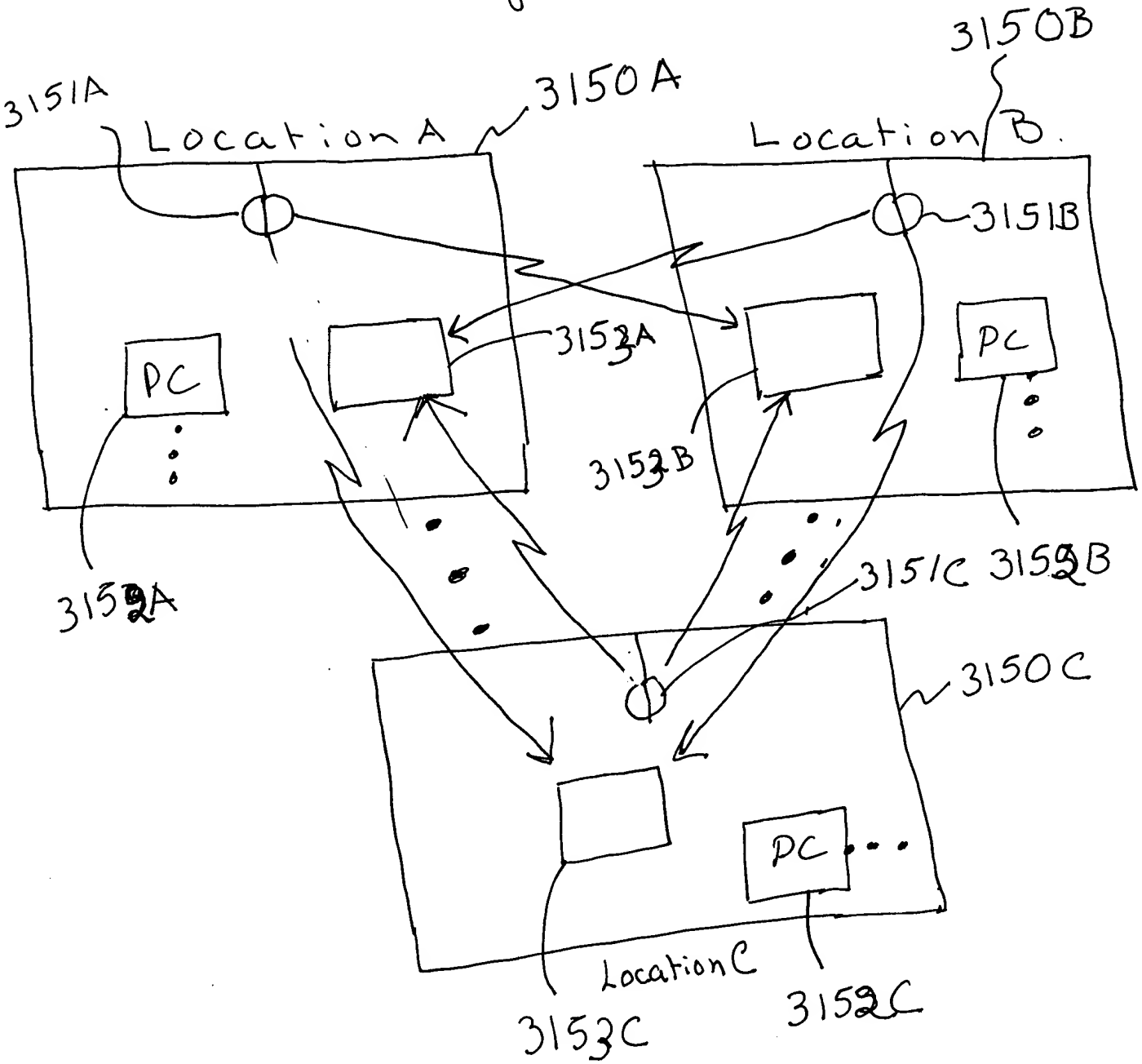

3150B
3151A
3150A
Location A
Location B
3151B
PC
PC
3153A
3153B
3152A
3151C
3152B
3150C
PC
Location C
3153C
3152C

Figure 31 B.

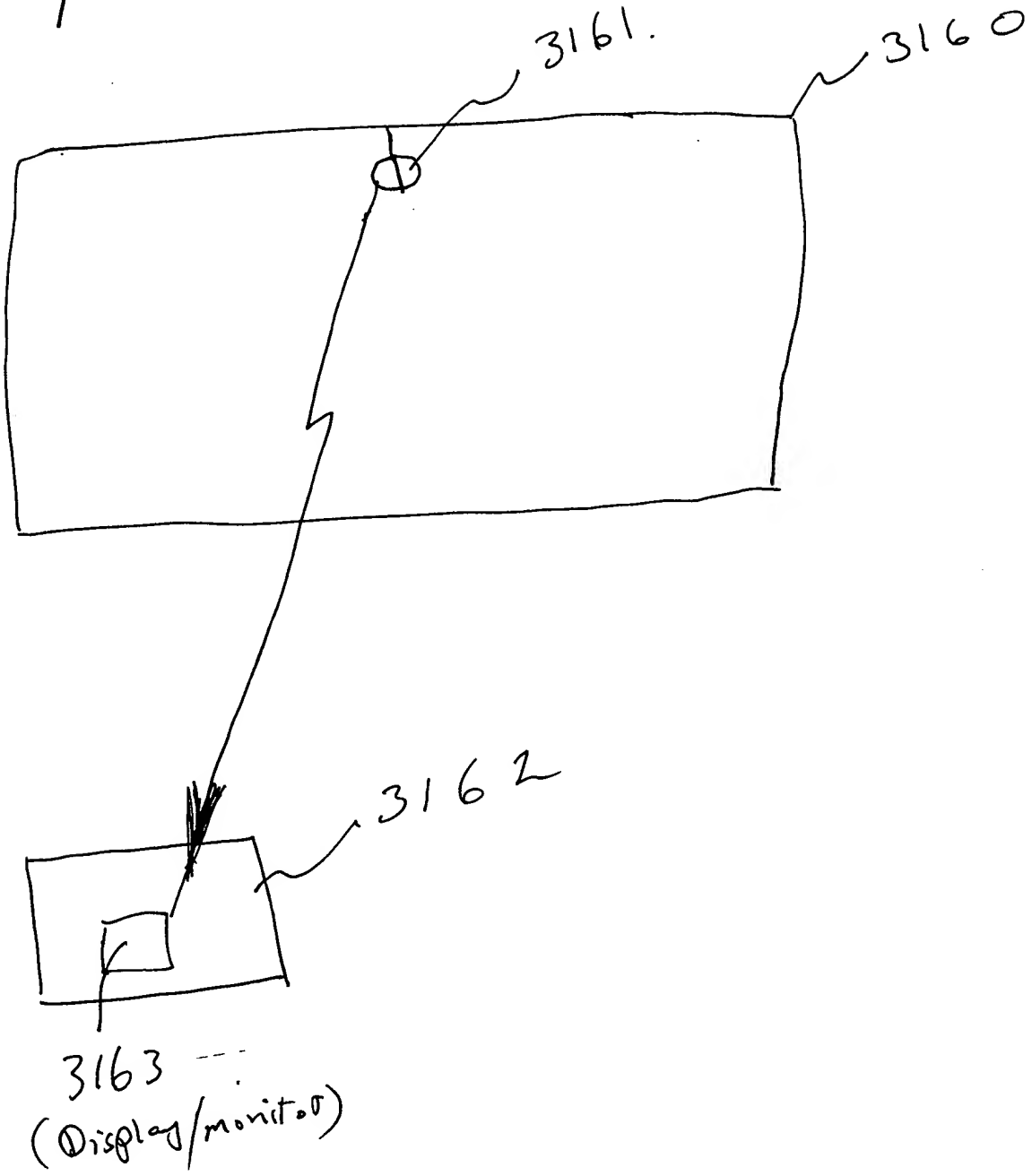
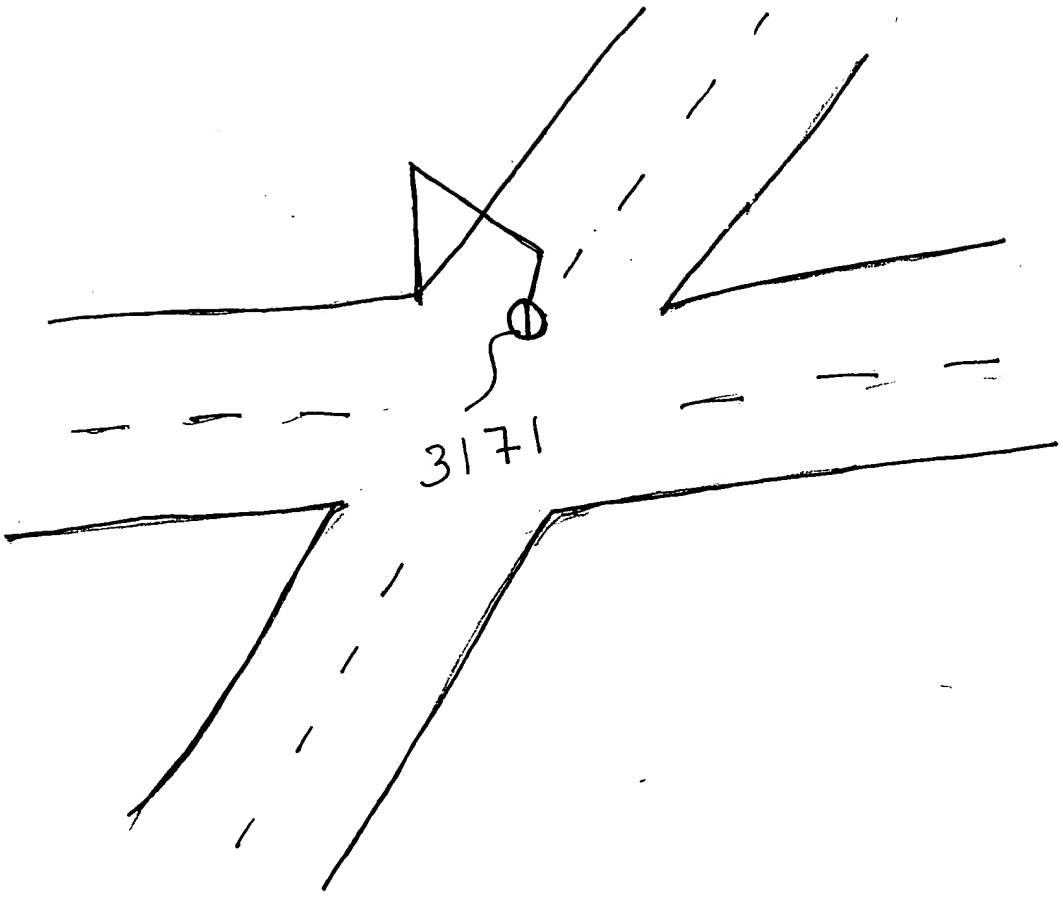



Figure 31C